Protective Actions For A Hazardous Material Release

A US Air Force Protective Actions Planning Guide For Individuals and Facility Managers

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DISTRIBUTION

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1. Introduction

a. Each year there are hundreds of incidents in the United States in which airborne hazards are released. These hazards are commonly referred to as hazardous fumes, noxious chemicals, or mysterious odors. They permeate buildings and cause illness, injuries, or disruption of activities. In most cases, these incidents result in building or area evacuations. This action is the natural response in such emergencies and usually the only practical course of action by which the occupants can reach clean air and safety. In some situations, emergency response personnel may direct people to remain inside buildings or vehicles and implement shelter-in-place actions.

b. Protective actions for airborne hazards include actions taken when people are outside of a building and actions taken when they are inside the building. The inside building actions, known as sheltering or protecting in-place, depend upon whether the hazard release occurred inside or outside the building. Protective actions for both situations are covered within this document.

c. Shelter in-place actions can provide short-term (one-to-two hours in some cases) protection to the occupants and are most effective when building occupants plan and practice their actions in advance. Most are simple, low or no-cost actions performed by the occupants or facility manager. Sheltering in-place is not the solution for every situation. However, it may be the only practical method to provide protection for residential housing or for buildings with large populations such as dormitories, auditoriums, movie theaters, and office buildings. Other good candidates for sheltering in-place include schools, medical facilities, childcare centers, and other buildings that are unable to evacuate or transport most or all of the occupants to safe areas. Although the primary reason to shelter inside buildings is to increase protection, these actions also provide emergency responders with the time they need to control or contain the release and coordinate evacuation strategies.

d. Buildings can provide protection in varying degrees against airborne hazards that originate from the outside. Such protection is limited, however, and effective only under certain conditions. Conversely, the hazards produced by a release inside a building can be much more severe than a similar release outside. Because buildings allow only a limited exchange of air between the inside and outside, not only can higher concentrations occur when there is a release inside or directly into a building, but inside hazards are more likely to last longer.

e. Most of these incidents will likely involve accidental releases of industrial materials such as toxic industrial or agricultural chemicals. They may also involve releases of biological or radiological material. Some may be the result of malicious acts -- vandalism, pranks, or terrorism. These incidents will likely occur with little or no warning

and require individuals and groups to quickly implement protective actions based upon their assessment of the situation or directions from emergency response personnel.

f. Accounts of incidents similar to these that follow appear in newspapers regularly and illustrate the effects of such incidents and the variety of ways they can occur. They also show why effective protective actions depend upon whether the release occurred on the inside or outside of the building.

(1) In Phoenix, Arizona, an unknown gas permeated a large office building, causing 2,500 employees to be evacuated and 80 to be taken to a hospital. The source of the gas was never determined, although it was suspected to have been released accidentally from a passing truck on a nearby freeway and to have entered through the building's fresh-air intakes.

(2) At the airport in Birmingham, Alabama, herbicide vapors were drawn into the radar room in the air traffic control tower after herbicide was sprayed on weeds near the base of the tower. Employees in the radar room experienced symptoms ranging from bloody noses to dizziness to euphoria. Seven were treated at a hospital. The vapors, which entered through the air-conditioning system, caused operations in the radar room to be moved to another location.

(3) In Fort Worth, Texas, mysterious fumes sickened about 200 people in an office building, sending 72 to hospitals and creating hysteria as dizzy, teary-eyed victims stumbled from the building gasping for air, vomiting and, in some instances fainting. One victim said he didn't smell anything but saw people all around getting sick.

(4) In Eggertsville, New York, 100 nursing home employees and residents were evacuated after they became ill from unidentified fumes inside the building. The fire department was called to the building in response to complaints about odorless fumes that caused coughing, sneezing, and tightness in the chest. Eleven people were treated at hospitals.

(5) In San Jose, California, three young men unleashed blasts of pepper spray inside four stores, exposing 128 people to eye-burning fumes, forcing evacuations and prompting one-fifth of the city's firefighters to be called out to treat them.

(6) In San Antonio, Texas, a tractor-trailer rig overturned during the morning rush hour on a ramp at the northwest corner of downtown, spilling 4,500 gallons of hydrochloric acid. About 5,000 people were evacuated from a three-square mile area, including 2,600 students from several schools.

2. Purpose and Scope

a. This document provides recommendations for individual protective actions and presents a variety of ways to protect building occupants from airborne hazards. The goal is to prevent, protect against, and reduce the effects of a hazardous materials release. It contains guidelines to assist individuals and facility managers to minimize the potential

effects of hazardous materials released in accidents or as a result of malicious acts or natural phenomena.

b. These protective measures can be as simple as defining a protective-shelter plan and training the building occupants to implement the actions. Some are pre-engineered design measures for new construction or a retrofit that can reduce the likelihood that releases will affect building occupants. All are designed to complement security or force protection measures such as those intended to prevent unauthorized building entry, an internal release, or an external release close to the building. Base organizations should contact the Civil Engineer Readiness Flight for assistance in coordinating requirements and developing shelter plans and procedures.

c. Some of these protective measures are practical only for new construction, while others are suitable for retrofit of existing buildings. Also presented are low-cost, expedient measures and operational procedures for reducing vulnerability or for mitigating the hazard once a release has occurred. This document does not address construction or design of collective protection or overpressure systems. Sources for this information are provided in **Attachment 1**. The following protective measures are presented:

- Physical security and entry screening measures
- Individual protective actions
- Evacuation planning and execution
- Sheltering in-place
- Shelter plan considerations

3. Facts About Airborne Hazards

a. Most strategies to protect people from airborne hazards require some advanced warning or a means of detecting the hazard. Advanced warning may be provided from the Security Forces, Air Force Office of Special Investigations, or other sources and disseminated through the various installation command and control networks. Depending upon the type of material, hazard detectors may be used to provide warning of a release. Although effective and inexpensive devices are widely available for detecting smoke and fire, there are presently no detectors that can rapidly alert occupants to a broad range of chemical, biological, or radiological hazards. If advanced warning is not provided and detectors are not available, personnel must initially react to the situation based upon what they see, hear, feel (touch or contact), and smell.

b. Most hazardous chemicals have warning properties that provide a practical means for detecting a hazard and initiating protective actions. Such warning properties make chemicals perceptible; that is, chemical aerosols, vapors or gases can be perceived by the human senses (by smell, sight, taste, or irritation of the eyes, skin, or respiratory tract) before serious effects occur. The concentrations at which an individual can detect an odor vary from person to person, and these thresholds also vary relative to the level that can produce immediate, injurious effects. In addition, these perceptions may be masked or difficult to distinguish from sounds, sights, or smells normally present within a work or outside area. The most important indication is that something different from the norm has occurred and action needs to be taken.

c. Most of the industrial and agricultural chemicals and chemical warfare agents are readily detectable by smell. For example, soldiers in World War I and World War II were taught to identify by smell such agents as mustard, phosgene, and chlorine. This detection method was proven effective for determining when to put on and take off the gas mask. One exception is a chemical warfare agent called Sarin, which is odorless and colorless in its pure form.

d. Biological agents and radiological materials are also odorless. Real-time detection devices are available to detect some chemical agents and most radiological materials. At present, there are no biological agent detection devices that can determine the presence of biological agents in the air in real-time. Installations that are equipped with chemical and biological agent and radiological material detectors should structure their response plan and procedures based upon the capabilities and warning times provided by the detectors they employ.

e. In the absence of an advanced warning, people can also be alerted to an airborne hazard by observing symptoms or effects in others. This provides a practical means for initiating protective actions because the susceptibility to hazardous materials varies from person to person. The concentrations of airborne materials may also vary substantially within a given building or room, or environmental condition. These variations may present a greater hazard to some occupants than to others.

f. Other warning signs of a hazard may involve seeing and hearing something out of the ordinary, such as the hissing sound caused by the rapid release from a pressurized cylinder. Awareness to warning properties, signs, and symptoms in other people provide the basis for taking the protective actions described in **Section 7**. **Sections 7 and 8** outline planning considerations for sheltering in-place, evacuation of hazardous areas, and purging the building following a release.

g. For protection against imperceptible agents, the only practical protective measures are those that are continuously in-place. This requires filtering the outside air (see the references at **Attachment 1**) on a continuous basis and using automatic, real-time detectors that are capable of detecting the imperceptible agents. It also requires that individuals increase their awareness and observe and report warning indicators or suspicious activity.

h. To define protective measures for buildings and individual protective actions, releases are divided into two general types: external and internal building releases.

i. External releases may result from accidents involving industrial storage or transport, fires, or malicious acts. The downwind airborne hazard produced by the release is referred to as the plume or cloud. The airborne hazard from an external release normally ends when the release ends and the plume moves downwind. However, depending on the type of agent or material released and the environmental conditions, the plume passage may not necessarily mean that there is no residual (remaining) hazard. Some construction materials, such as bricks or asphalt used on roads or roofs, may absorb the agent while other surfaces may hold the agent.

j. An important consideration is that in external releases, the source of the hazard is almost always at or near ground level. When gases or aerosols are released at ground level, the plume tends to remain at ground level at night and during periods from 1-2 hours before and after sunrise or sunset. If not, the plume is diluted as it rises under conditions that typically occur on sunny days.

k. Buildings or other structures can channel the downwind plume movement (called the "canyon effect"). They can also confine and concentrate the cloud within built-up areas such as the warehouse and industrial areas of an installation.

l. For radiological, biological, and some chemical releases, the plume may also contain a fine aerosol of solid or liquid particles. Depending upon the wind speed and particle size, the heavier particles will fall closest to the release point while lighter particles will fall farther downwind. After the particles reach the surface, the respiratory hazard may be reduced, but is not eliminated. Depending upon the agent or material and environmental conditions, these particles may continue to be a contact (touch) or vapor hazard. But, they do not present an immediate contact hazard to personnel inside a shelter in-place-protected building.

m. Internal hazardous material or military agent releases may occur inside the building and could affect all occupants. The cause may be an accidental spill of an industrial chemical or a release of biological or radiological material. It could also be the result of a deliberate act. Depending upon the release location and type of hazardous material, the building will normally contain the release and present little or no hazard to personnel outside of the building. Personnel inside the building may be affected if they are within the immediate area of the release or if the airborne material is distributed to other areas through the building heating, ventilation, and air conditioning (HVAC) system. In most cases, the response to an internal release will be to warn building occupants, attempt to contain the hazard within the immediate area of the release, and evacuate the building.

4. Determining A Building's Protective Capability

a. Effective shelter in-place actions require a basic understanding of how buildings protect people from airborne hazards. This knowledge will enable the occupants or facility managers to focus upon the actions that provide the highest degree of protection.

b. A building is a system of barriers that protects the occupants from the outside environment. This barrier system is incomplete, however, because it contains both intentional and unintentional openings to the outside. Intentional openings include doors, windows, vents, and outside air intakes, and unintentional openings include cracks, joints, seams, holes, and pores. The combined effects of wind, fans, natural convection (chimney effect), and these openings act to gradually exchange the inside air with outside air. In general, the number of openings, their locations, the forces that drive the exchange of air through the openings, and the presence of any filtering media determines the protection provided by a building against an external airborne release.

c. Under usual operations, a building does little to protect occupants from external airborne hazards because outside air must be continuously introduced through these openings to provide a comfortable, healthy inside environment. A building can provide substantial protection against agents released outside only if the flow of fresh air is filtered, temporarily interrupted, or reduced, and the building openings are closed or sealed. Interrupting the flow of fresh air by reducing the flow of air through the building openings is the principle applied for sheltering in-place.

d. To a very limited degree, a building acts as a natural filter. Natural filtration occurs as a small portion of vapors, gases, and aerosols that enter a building become deposited in the building shell or upon interior surfaces as outside air flows into and through a building. To filter air at a high efficiency requires the use of special filters in a forced-air ventilation system (see **Attachment 1**, References).

e. Buildings with a HVAC system that provide forced-air ventilation are designed to introduce outside air at a rate of 15 to 20 cubic feet per minute per person. In the normal HVAC operating mode, there is a constant potential for contaminants released outside a building to be transported inside. In buildings with forced-air ventilation HVAC systems, the outside air enters predominantly through the fresh (outside) air intakes. A smaller portion enters by infiltration through joints, seams, cracks, and pores in the building shell.

f. Once contaminated air enters a building, the HVAC system transports it rapidly to various parts of the building. Within each ventilation zone, it can also be drawn through the HVAC return ducts and distributed through supply ducts at high rates of flow. It is then distributed through stairwells or elevator shafts. Contaminated air can also be transported (by air flow) between zones of a building through hallways and occupied spaces.

g. Buildings that do not have forced-air ventilation HVAC system meet fresh air requirements by infiltration and natural ventilation. Though less-tightly constructed, such buildings are less vulnerable to external releases when windows and doors are closed. With windows and doors closed, the paths of entry for outside air are smaller and more diffused than in buildings with forced-air ventilation systems.

h. Building occupants or the facility manager can determine their vulnerability to an internal release of hazardous materials by assessing four factors. These are: (1) the presence of hazardous materials stored in the building, (2) security measures to prevent unauthorized personnel or hazardous materials from being brought into the building, (3) security measures outside the building to prevent unauthorized access (fenced-in areas, vehicle gates, barricades, cleared or open areas), and (4) architectural and mechanical features to isolate or limit the spread of hazardous material if an internal release occurs.

i. Hazardous materials can be carried into a building by people or in the delivery of mail, supplies, and equipment. Therefore, vulnerability to an internal release is also determined by the accessibility of the building to the public and the presence of entry-screening measures for people, mail, and supplies.

5. Protective Measures for Buildings. Several design and security measures can be applied to reduce the potential for hazardous materials entering a building from a ground

level, outside release. Some may be incorporated into the building to provide full-time protection while others should be initiated when advanced warning is received, or as soon as the building occupants discover that a release has occurred.

a. Elevate Fresh Air Intakes.

(1) Elevating the intakes for outside air is most easily applied in new construction but can be retrofitted for existing structures. The effectiveness of elevating intakes has practical limits. For example, a plume or cloud of hazardous materials may reach the intakes, particularly if the source is large and distant. Specific building requirements should be identified during the building assessment (**Attachment 4**). Properly employed, this measure has two main benefits:

(a) It provides passive security against malicious acts, making it more difficult for hazardous material to be inserted directly into the building's HVAC system and to be conveyed to various parts of the building.

(b) It makes it less likely that high concentrations of hazardous material will occur at the intakes if there is a ground-level release near the building. For example, a common problem for buildings with ground-level intakes near streets or parking areas is that exhaust fumes can be drawn inside under certain conditions of wind and stability. By elevating the intakes, the amount of dilution increases with the distance from the source. In stable environmental conditions, contaminants released near the ground will likely remain close to the ground unless the airflow over the building lifts it upward. Contaminants that are heavier than air will also tend to remain close to the ground under calm weather conditions. These factors combine to reduce, or in some cases eliminate, contaminant entry into the HVAC system and the building.

(2) Air intakes should be located at least 10 feet above ground level intakes or at the highest practical level on the building. For protection against malicious acts, screens should also cover the intakes so that objects cannot be tossed into the intakes or into air wells. The screens should be sloped to allow thrown objects to roll or slide off the screen and away from the intake.

(3) Many existing buildings have air intakes that are located at or below ground level. For those that have wall-mounted or below-grade intakes close to the building, these intakes can be elevated by constructing a plenum or external shaft. The plenum or shaft should have water drains positioned so they are not easily accessible. The drains must also prevent air from being drawn into the system.

b. Provide Security for Existing Fresh Air Intakes: Some protection can be gained for existing buildings with physical security measures. For buildings with air intakes below ground level, at ground level, or wall-mounted outside of secure areas, fencing should be installed around the intakes. Use surveillance cameras and motion detectors to monitor the intake(s) and identify unauthorized activities. These measures can minimize susceptibility to malicious acts but are less effective than elevating the intakes. Under certain conditions, ground-level releases from points outside the area fenced or under surveillance may still reach the air intakes.

c. Secure HVAC Mechanical Rooms: The simple measure of maintaining physical security on HVAC mechanical rooms may prevent the direct introduction of an agent into the system of ducts that distribute air to the building. This measure requires locking and controlling access to all mechanical room interior and exterior doors that contain HVAC equipment.

d. Secure Hazardous and Flammable Material Storage Areas: Secure and limit access to interior and exterior storage areas where bulk quantities of hazardous or flammable materials are stored. Secure gas and gas bottle storage areas. Hospitals and industrial activities use various bottled gasses, such as oxygen or acetylene, that are highly flammable. Flammable gasses or material could dramatically boost an explosive charge detonated within these areas. The resulting fire could also release toxic products from surrounding plastics or other material.

e. Isolate Entry, Receiving, and Material Holding Areas.

(1) For buildings with access control, there are three entry zones of concern for deliberate internal releases of hazardous materials. These entry zones are 1) the lobby, in which people await entry into the secure area of the building, 2) the mailroom in which mail is received for screening, sorting, and distribution, and 3) the area in which supplies or equipment are received and held temporarily awaiting distribution.

(2) If people, mail, or supplies/equipment enter the building before being screened, the ventilation system of the entry or lobby area in which they await screening should be isolated from the rest of the building. This prevents the movement of airborne hazards to the protected areas of the building if a release occurs before screening. This isolation may be achieved by providing:

- A separate HVAC air-handling unit for the entry area
- Exhaust fan(s) to create a slightly negative pressure differential in the entry area
- Full-height walls surrounding the entry area
- An airlock or vestibule for the exterior doors to maintain the pressure differential as people enter and exit. If entries are infrequent, then an airlock is not necessary, particularly for mailrooms or supply receipt areas

(3) Isolated entry zones can be incorporated into both new designs and retrofits. These measures can also reduce the potential disruptive effects of hoax letters or packages purported to contain chemical or biological agents or radiological material. Building codes may cover requirements for isolating storage areas where hazardous materials are kept or processed within a building. The approach for isolation is similar for these storage areas.

f. Separate HVAC Zones: Buildings that are equipped with HVAC systems use either a single or multiple zone configuration to efficiently move air throughout a building. For buildings with multiple HVAC zone systems, isolate the separate zones to minimize the potential spread of an outside airborne hazard within the building. This method will also

reduce the number of people potentially exposed if there is an internal release. In essence, zone isolation divides the building into separate environments and limits the effects of single release to an isolated portion of the building. Zone isolation requires full-height walls between each zone and its adjacent zone and hallway doors to achieve the greatest benefit.

g. Secure Exterior Windows: Secure windows can prevent or limit the effects of certain types of intentional or malicious acts involving grenades or thrown dissemination devices. Securing windows includes locking against forced opening, installing protective screens or covers, or installing windows that are resistant to being broken by thrown objects.

h. Install Single-Switch Controls for Sheltering In-Place and Purging.

(1) Sheltering in-place (discussed in **Section 7**) is a protective action for use against an external release when there is forewarning. This protective action requires that all fans that induce air infiltration (outside-air fans, exhaust fans, and air handling units) be turned off before the plume of hazardous material reaches the building.

(2) In large buildings, switches for deactivating these fans are often in diverse locations that may not be readily accessible in the short period available after a warning is received. To be effective, fans must be deactivated quickly to provide the best protection. This can be achieved by installing an emergency shutoff switch that will immediately shut down the air distribution throughout the building. Another method is to install relays to turn off all fans affecting outside air exchange. The emergency shutoff switch should be located where it is readily accessible to the facility manager, building security personnel, or people working in the immediate area where the switch is located. This protection can be further enhanced by installing automatic dampers on outside air intakes and on exhaust fans that are not already equipped with back-draft dampers.

(3) A third measure for enhanced passive protection is to provide easily accessible controls for smoke purge fans that will allow the building, or selected floors to be purged rapidly by the introduction of outside air at high rates of flow. This capability has two applications for sheltering in-place: 1) when directed by emergency response personnel after an internal release, and 2) once the plume has passed after an outside release.

i. Install Vestibules and Airlocks: Vestibules, airlocks, and revolving doors provide a means of controlling air infiltration at main entrances as people enter and exit the building. Their main purpose is to prevent or limit the direct entry of outside air into the building.

6. Security Measures To Prevent and Internal Release

a. Generally, there are two ways to protect against an internal release of hazardous materials. One is to prevent containers of hazardous materials from being brought into a building in the routine flow of people, mail, and supplies. The second is to employ zone isolation, purging, or internal filtration to minimize the effects if an internal release occurs.

Zone isolation, purging, or internal filtration to minimize the effects of an internal release are discussed in **Section 7**.

b. Prevention involves physical security measures to prevent the entry of containers that may hold hazardous materials. This requires integrating procedures for detecting and examining such containers into the building's access control and entry screening procedures. These procedures must be rapid and simple enough to use in conjunction with the routine security measures. The purpose of such screening is to prevent the malicious, intentional release of hazardous materials inside the building.

c. Entry screening is a two-step process. The first step is detecting a closed container and the second step is to determine whether the contents of the container are hazardous or likely to be hazardous. Step one involves the use of the existing x-ray system, metal detector, radiological material detector, or a manual search of briefcases, handbags, packages, letters, or boxes of supplies. Items to be excluded or controlled are:

- Pressurized dispensers of pepper spray, mace, or tear-producing agents
- Aerosol cans or other pressurized containers
- Manual or electric spray devices
- Containers with liquid or powder without labels identifying their contents
- Bottled gases typically used for repair or maintenance within the building

Some characteristics of suspicious mail, freight, or parcel packages and letters include the following:

- Excessive postage
- Handwritten or poorly typed addresses
- Misspellings of common words
- Incorrect titles or a title, but no name
- Oily stains, discolorations or odor
- No return address or shows a city or state in the postmark that does not match the return address
- Excessive weight
- Lopsided or uneven envelope
- Protruding wires or aluminum foil
- Excessive security material such as masking tape, string, etc.
- Visual distractions
- Ticking sound
- Marked with restrictive endorsements, such as "Personal" or "Confidential"

d. Step two involves visually examining the storage container, its contents, and its content labels. A liquid or powder in a container with no label is reason for exclusion. If contents are labeled, the next step is to determine if the contents agree with the label. This involves examination for alterations of the container or it can involve the use of ultrasonic detection devices for liquids that can determine if the contents agree with a known standard of similar material. Consideration should be given to admitting only sealed containers. Since biological agents would likely appear as powders and some chemical agents appear

as clear, odorless fluids, they could easily be mistaken for a benign substance in a properly labeled container.

e. If the container or package is excluded, controlled, or is suspicious, immediately report the incident to the Security Forces and area supervisor. Do not further touch, disturb, or move the item. Accomplish individual protective actions and follow local procedures as required by the situation.

7. Protective Actions

a. Once the presence of an airborne hazard is detected, there are several potential protective actions that can be taken. Specific actions are based upon the situation and should be employed as necessary or when directed by emergency response forces. They include:

- Individual protective actions
- Evacuation
- Sheltering in-place

These actions, of course, are not applicable for protection on a continuous basis but can be implemented, either singularly or in combination, to provide protection for relatively short periods. These measures apply only to perceptible agents, agents or material detectable by automatic detectors, or in response to events resulting in release of agents. Examples of events that require a response are an explosion or fire at a storage building or a highway or rail accident involving a hazardous material transport vehicle.

b. Effective actions require a shelter plan specific to each building and generalized for the installation. Training and familiarization (exercises) ensure building occupants can execute actions quickly and do not compromise building protection if a release occurs. Shelter plan preparation and occupant training is discussed in **Section 8**.

c. Individual Protective Actions.

(1) The decision to take individual protective actions must be made quickly and implemented immediately when notice of a hazardous material release is received. Actions are provided for three primary scenarios: (a) personnel who are outside of a building, (b) personnel who are inside a building when a hazardous material is released outside the building, and (c) personnel who are inside the building when a hazardous material is release inside the building. Once individual actions are complete, provide assistance to the injured, those with mobility limitations, the elderly, and children. Also provide assistance to those with limited mental acuity who may be easily confused or overwhelmed by the commotion, noise, sirens, or alarms. The actions below depend upon the situation and may be modified based upon advanced warning of a release or at the direction of emergency response personnel. These actions are also presented in **Attachment 2**.

(2) Individuals who observe the incident or have information concerning the incident should contact Security Forces, or other emergency response personnel, as soon as possible after the incident occurs.

(3) Individuals or units should take the protective actions appropriate for the situation. These actions should be taken when directed by the chain of command, emergency response forces, or when one or more of following occur:

- Sensory Indications
  - Strange or pungent odor in the building (beyond normal limits)
  - Irritation of the eyes or throat reported by people in the building
  - Smoke or a fog in the building
  - Audible signs such as the release of gas under pressure or an explosion in or near the building

- Symptoms
  - Multiple instances of nausea, vomiting, choking, tearing, or irritation of the eyes or throat
  - Skin irritation, reddening, or discoloration of the skin
  - Multiple people who collapse or become unconscious
  - These symptoms observed in other people in the building

- Evidence Indicating Malicious Acts
  - Discovery of a spray device in or near the building (pressurized cylinder, batteries with pump and nozzle, container of liquid, gas, or powder)
  - Suspicious individual in or around air intakes or HVAC mechanical rooms
  - A suspicious package, parcel, or luggage left unattended in the building
  - A parcel or letter that contains or threatens to contain hazardous material

- Report or Observation of a Hazardous Material Release
  - Observation of unexplained evacuation of nearby offices or buildings
  - Notification of an outside hazard, such as an overturned tanker truck or rail car
  - Notification that there is an internal spill of hazardous material or a release of hazardous material stored inside

d. Actions for Personnel Outside of Buildings. If you are outside, take cover as needed to protect yourself from fire, explosive hazards or falling objects. Notify other personnel in the vicinity, don available protective equipment, and evacuate the area by moving in an upwind or crosswind direction away from the point release (if visible). Report the incident to the Fire Department or Security Forces desk if emergency response forces are not at the scene. Move to the unit assembly point (if not within the hazard area) or location provided in the protective actions plan. Perform self-aid and buddy care as needed. Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk. If you are already in a

vehicle, roll up windows, turn-off the ventilation system, and attempt to safely exit the hazard area. If you cannot evacuate, go to the nearest building and take cover inside. After evacuation or sheltering, contact your unit control center and advise them of your location and situation. Remain in the shelter or at the assembly area and continue to wear protective equipment (if available) until directed otherwise by your unit or emergency response personnel.

e. Actions for Personnel Inside of Buildings - External Hazardous Material Release. Take cover as needed to protect yourself from fire, explosive hazards or falling objects. Don available protective equipment. Notify other personnel in the vicinity. Report the incident to the Fire Department or Security Forces desk if emergency response forces are not at the scene. Turn off the building HVAC system and exhaust fan(s). Implement shelter in-place procedures. Lock up or secure classified material and funds. Move to the designated safe room, if available. Perform self-aid and buddy care as needed. Evacuate the building if directed by the unit control center or emergency response forces. If directed, evacuate by moving in an upwind or crosswind direction away from the point release (if visible). Move to the unit assembly point (if not within the hazard area) or location provided in the shelter plan. Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk. Contact your unit control center or the Base Command Post and advise them of your location and situation. Remain in the shelter and continue to wear protective equipment (if available) until directed otherwise by your unit or emergency response personnel. Do not allow building entry or exit during the plume passage. However, remain alert for personnel seeking entry into the building to seek shelter from the incident. Allow entry if identification is confirmed and the situation does not present a high risk to others within the building. When notified that the outside hazard has passed (determined by emergency response personnel), perform building purge procedures.

f. Actions for Personnel Inside of Buildings - Internal Hazardous Material Release. Take cover as needed to protect yourself from fire, explosive hazards or falling objects. Don available protective equipment. Notify other personnel in the vicinity. Report the incident to the Fire Department or Security Forces desk if emergency response forces are not at the scene. Turn off the building HVAC system and exhaust fan(s). Perform self-aid and buddy care as needed. Close all doors and windows within the release area to contain the hazard. Lock up or secure classified material and funds. Evacuate the building. Once outside, evacuate by moving in an upwind or crosswind direction away from the building. Move to the unit assembly point (if not within the hazard area) or location provided in the protective actions plan. Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk. After evacuation, contact your unit control center and advise them of your location and situation. Remain at the assembly area and continue to wear protective equipment (if available) until directed otherwise by your unit or emergency response personnel.

g. Evacuation.

(1) Evacuation is the simplest and most reliable action, but it may not be the best course of action for all situations. For example, if a release occurs outside of building and personnel are directed to evacuate, their risk of exposure may increase rather than

decrease. In this situation, consider sheltering people in-place until safe evacuation routes are established or the hazard is gone. Once an evacuation is declared, only emergency response and security forces will be allowed to enter or re-enter the hazard area.

(2) If people are not in immediate danger, three considerations must be addressed before directing evacuation in a hazardous materials release area: (1) determine if the source of the hazard is internal or external to a building, (2) clearly communicate to people the direction to evacuate and a destination, and (3) determine if the evacuation may create unacceptable risks.

(3) If the source is external to a building and an agent has infiltrated the building, evacuation and the use of individual protective equipment (if available) is the safest option. Sheltering in-place may also be an option, but generally should not be employed once the hazardous material has begun to infiltrate a building.

(4) If the source is inside a building, the building enclosure may contain the hazard if the HVAC system is turned off and doors and windows closed. In this situation, the affected building may be evacuated while occupants of other buildings within the area may be directed to shelter in-place.

(5) Evacuation may also increase other risks to people. Consider that the evacuating people may block entry to the site and delay emergency response forces. Also, consider the effect of the weather on the people evacuating. If the incident was intentional, then a second or third incident may be planned to occur to affect people in the open.

(6) When people evacuate an area, they should:

(a) Move as far away from the incident as possible but don’t place themselves in danger from other hazards (traffic, secondary explosions, etc.).

(b) Stay out of the "line of sight" of the incident and keep away from glass windows or other materials that could cause injury should an explosion occur.

(c) Remain alert for additional or secondary releases or explosions in the immediate area.

(d) Do not enter or re-enter the hazard area. Emergency response forces will notify people when it is safe to re-enter the area.

h. Sheltering In-Place.

(1) Evacuation and sheltering in-place are the two primary protective actions planned for and employed by many US communities in the event of an accidental release of toxic materials. The advantage of sheltering in-place is that it can be implemented more rapidly than evacuation. It may also be the only means to provide protection for people with limited mobility or for school, child care, club, and medical facilities. The disadvantage is that the protection it provides is variable and diminishes with the duration of the exposure.

(2) Sheltering in-place requires three distinct actions to be taken without delay to maximize the passive protection a building can provide.

(a) First, the inside-outside air exchange rate of the building must be reduced before the hazardous plume arrives. This is done by closing all windows and doors and turning off all fans, HVAC systems, window air conditioners/heaters, fireplace vents, and combustion heaters. In some cases, the HVAC system may be switched to a closed or recirculation mode to eliminate outside air entry.

(b) Second, building entry and exit must cease during the period of plume passage.

(c) Third, the air exchange rate of the building must be increased as soon as the hazardous plume has passed (determined by emergency response personnel) to purge the building of any residual airborne contamination. Increase the air exchange rate by opening all windows and doors, turning on all exhaust fans, and turning on or opening the HVAC system(s) to aerate the building.

(3) Even a tightly sealed, closed building does not prevent contaminated air from entering. It only minimizes the rate of outside air infiltration. The outside air will enter more slowly, and once the external hazard has passed, the building will release the contaminated air slowly as long as it remains closed.

(4) The level of protection that can be attained by sheltering in-place is substantial but it is much less than can be provided by high-efficiency filtration of the fresh air introduced into the building. The amount of protection varies with the following factors:

(a) The Building's Air Exchange Rate. The tighter the building -- the lower the air exchange rate -- the greater the protection it provides. In most cases, air conditioners and combustion heaters cannot be operated while sheltering in-place because doing so increases the air exchange rate.

(b) Duration of Exposure. Protection varies with time, diminishing as the time of exposure increases. Sheltering in-place is suitable only for exposures of short duration, roughly 2 hours or less, depending upon conditions.

(c) Purging or Period of Occupancy. The length of time occupants remain in the building after the hazardous cloud has passed also affects the level of protection. Because the building slowly releases contaminants that have entered, at some point during cloud passage the concentration inside exceeds the concentration outside. Maximum protection is attained by increasing the outside air exchange rate after cloud passage -- or by simply exiting the building into clean air.

(d) Natural Filtering. Passive filtering occurs when the agent is deposited in the building shell or on interior surfaces as it passes into and out of the building. The tighter the building, the greater the contribution of passive filtering to the protection factor.

i. Protection for Residential Housing and Office Buildings. In residential-type buildings or manufactured homes, take the following actions to prepare the building for sheltering in-place: close windows and doors, turn off all air conditioners, fans, and combustion heaters. Office buildings, auditoriums, and dormitories require similar but often more complex actions. Actions for these building require pre-planning and may require more time to implement. A recommended list of shelter kit items is provided at **Attachment 3**. Within all types of buildings, air-handling units must be turned off and dampers (if they are controllable dampers) must be closed or sealed. If pets or other animals will be sheltered, consider the need for additional space and supplies required to care for the animals during the shelter period. Procedures for an action plan should include:

(1) Identify all air handlers, fans, and the switches needed to deactivate them within the building.

(2) Identify a central safe room or area within the building where people will assemble when shelter in-place procedures are implemented. Select an area that provides as many barriers (walls, doors, etc.) as possible to limit or slow agent entry. For multi-story buildings, select an area above the ground floor level to enhance protection against airborne hazards that tend to move or settle at or near ground level. Select a room that has no (or as few as possible) windows and outside doors. The room should have telephone communications, a radio or television, and a minimum of 10 square feet of floor space for each planned occupant. Close off and seal all doors, windows, and access paths that lead to the safe room. Seal all doors, windows, air vents, and drains with plastic sheet and adhesive tape. Use damp towels or cloth to seal door gaps and entry paths.

(3) Consider providing chemical toilets, bottled water to support the expected number of occupants for up to several hours.

(4) Verify that people with mobility limitations can move to the safe room or protected area, or develop plans and designate people to provide assistance.

(5) Identify the procedures for purging the building after an internal release. These procedures include opening operable windows and doors, turning on smoke and exhaust fans, and turning on the air handlers and fans that were turned off prior to sheltering in-place.

j. Protection for Military Expeditionary and Temporary Structures.

(1) Military expeditionary and temporary structures include a wide range of structures that may be used by military forces in CONUS or OCONUS deployment. These structures may include tents, temporary buildings, trailers, or portable hard-wall shelters. This section addresses methods to protect people within these structures from a hazardous material release. Wartime collective protection solutions for these structures are provided in the references at **Attachment 1**.

(2) Use the procedures identified to protect people in residential and office buildings to the greatest extent possible. Some actions, such as use of a safe room, may be impractical because many of the expeditionary structures consist of only one room or

area. Use caution if plans direct personnel to seek shelter in bunkers or shelters that are below ground level. These low areas may collect hazardous material vapors or gases and may be hazardous areas after the downwind plume passes. Ventilate or purge these areas before allowing people to remove protective equipment or enter without protective equipment.

(3) If the analysis of hazardous materials threats for the area indicates that an accidental or deliberate release could occur at any time and without warning, consider implementing the following actions:

(a) Operate all HVAC systems, including window units, in the closed or recirculation mode (close the outside air dampers) at all times. Depending upon the type of system, this measure will substantially reduce the entry of outside air into the building without affecting day-to-day interior cooling or air quality. If a release should occur without warning, this action will substantially reduce the entry of contaminants into the structure through the HVAC system. If warning of a release is provided, follow the standard procedures for individual protective actions. Shut down the HVAC and air conditioning systems and purge the structures after the release ends.

(b) Provide individual protective equipment to personnel who normally operate outside of buildings. This may include Security Forces, Firefighters, and maintenance personnel. Pre-plan actions to maintain security of the area and ensure that hazardous operations, such as aircraft fueling or arming, are terminated quickly and safely if a release occurs.

(4) Develop local procedures to notify aircraft within the airfield terminal area of a hazardous material release. Normally, aircraft will not land or depart if a release occurs on or near the airfield. Notify taxiing aircraft of the hazard and, if possible, direct them to taxi the aircraft to a location outside the hazard area. Shelter in-place actions for aircrew members before or after taxiing include closing all hatches and windows and the use oxygen masks, if available. Aircrew members should implement other actions, as appropriate for the aircraft type, to limit the entry of outside air into the aircraft. For passenger aircraft, notify the passengers of the situation and prepare them to evacuate the aircraft if required by the situation.

8. Shelter Planning

a. A base shelter plan is the key to preparing for and coordinating a response to a hazardous materials release. The base plan provides the ability of an installation to respond rapidly to perceptible hazards of all types and to select the best course(s) of action. A building shelter plan is based upon a building assessment. It provides specific measures adapted to a single building that maximizes available protection options and provides occupants with instructions for shelter activation. This assessment should include representation from Security Forces, the Civil Engineer Readiness, Fire Protection, and Operations Flights, and the Bioenvironmental Engineering Flight. Use the following guidelines to prepare and implement a building shelter plan:

(1) The Facility Manager should conduct an initial building assessment to determine what protective actions are practical for the building and what hazardous materials are stored or used in or near the building. Use the Building Assessment Checklist for Sheltering In-Place at **Attachment 4** to assist in identifying building capabilities and measures to enhance protection. Once the initial assessment is complete, contact the Civil Engineer Readiness Flight to schedule an assessment and develop the shelter plan.

(2) Define specific procedures for:

- Determining if/when a hazard exists
- Deciding upon the best action to take based on conditions and events
- Communicating emergency instructions to all people in the building
- Evacuating, sheltering, purging, and/or using protective masks
- Personnel accountability procedures

(3) Pre-select assembly areas. Develop procedures for controlling, marshalling, and checking people within the assembly areas. Select assembly areas that most closely meet the following criteria:

(a) At least 650 feet from likely target buildings or hazards. Do not locate them near buildings with large plate glass or multiple windows.

(b) Locate where there is little chance of an improvised explosive device begin hidden. Open spaces are best. Avoid car parking areas because explosive devices can easily be hidden in vehicles.

(c) If possible, search the assembly area before personnel arrive. Select multiple or alternate assembly areas to reduce the possibility of an ambush and reduce the concentration of key personnel.

(4) Develop checklists for inside and outside building hazardous material release.

(5) Submit Work Order to Civil Engineering to complete required building modifications. These modifications may include security enhancements or permanent modifications to improve building sealing, safe room protection, or HVAC system controls.

(6) Designate and train shelter team members or designate individuals to implement actions (contact the Civil Engineer Readiness Flight for Shelter Management Team training).

(7) Train and familiarize (exercise) those who work or reside in the building on awareness and the procedures to be taken in an emergency (contact the Civil Engineer Readiness Flight for assistance).

(8) Identify aircraft notification procedures and actions for aircrew members.

b. Building Assessment Checklist. The purpose of the building assessment (see **Attachment 4**) is to gather information about the building's occupancy, ventilation system, and the characteristics that determine its vulnerability to an airborne hazard.

(1) Identify features pertinent to protective actions:

(a) Determine the type of ventilation system (natural ventilation, single-unit ventilators, or a duct system with central air handling units).

(b) If the building has a duct system, record the number of different zones and air handling units, and the locations of switches for each.

(c) Determine if the building has smoke purge fans and whether the intakes of the smoke purge fans are at ground level or elevated.

(d) Record the locations and identification of switches for the smoke purge fans.

(e) Determine if the building has automatic dampers in working condition on outside air fans and air handlers.

(f) List all exhaust fans and the location and identification of the control for each.

(g) Determine if stairwells are protected from smoke (external and isolated).

(h) Determine if the building have a public address system. If so, record the location of the broadcast microphone and controls.

(i) Record the information on communications with building security personnel.

(j) Obtain a copy of the evacuation routes posted for a fire emergency.

(k) Identify one or more safe rooms or areas to protect the planned building population. Request modifications to the room to enhance sealing and enable rapid use during emergencies.

(2) Gather information on hazardous or flammable materials stored or used in the immediate area (NOTE: This information is maintained by the building or area supervisor as part of the unit Hazard Communications Program):

(a) Determine what hazardous (chemical, biological, or radiological) or flammable materials (including gas cylinders) are stored in the building and identify their storage locations.

(b) Determine what hazardous materials are used in the building on a regular basis.

(c) Determine where the material safety data sheets (MSDS) for these materials are stored and review the warning properties listed.

(d) Determine what containment devices or ventilation systems are in-place to contain or isolate a release of these materials at the source.

(e) Check with the Civil Engineer Environmental Flight to determine what hazardous materials are stored or processed near the building. Compile a list of these, their approximate distance and direction from the building, and their warning properties.

(3) Identify features that make the building vulnerable to accidental releases or may increase the likelihood of malicious acts:

(a) If the building has mechanical ventilation with a duct system, record the location of all fresh air intakes that are at ground level where they are accessible to the public.

(b) List the locations of mechanical rooms having air handlers, whether each mechanical room is kept locked, and which have outside entrances. Contact the Civil Engineer to determine HVAC shut down procedures in buildings where the mechanical rooms or HVAC controls are not accessible by building occupants.

(c) Determine whether the lobby and any public access areas of the building share an air-handling unit with any of the office areas.

c. Training. Provide training for building occupants and facility managers on evacuation, sheltering in-place, and post-incident building purge procedures. This training should have four objectives:

(1) To develop an awareness of potential airborne hazards. When trained, the people within the building can better detect hazards and reduce the response time by being aware of odors, symptoms, or suspicious activities. The training should include familiarization with the warning properties of hazardous or flammable materials stored or used in or near the building, information on what actions are to be taken, and awareness of suspicious activities relating to fresh air intakes, mechanical rooms, and abandoned parcels within the building.

(2) To develop an understanding of the responses and protective actions, what to do for each of the four possible protective actions.

(3) To teach people how to use their assigned individual protective equipment.

(4) To inform building occupants about the building shelter plan and their responsibilities.

9. Decision Aid: Evacuate or Shelter In-Place? Once it is apparent that a hazard exists, the most important step for deciding on the best protective action is to determine quickly whether the source of the hazard is inside or outside the building. Recognizing that it may not always be possible to do so quickly, the best approach is to take action based on the most likely release location while continuing to
Investigate. This decision aid can be used by both emergency response personnel and building occupants. As new information about the release becomes available, re-evaluate and adjust actions accordingly.

a. If the source of the hazard is clearly inside the building (such as a spill of cleaning solution or an accident release of hazardous material stored in the building):

(1) Evacuate the affected floor(s)

(2) Initiate purging with smoke fans if available

(3) Consider use of protective masks, based upon indications of the type of hazard (masks may not provide protection for certain types of materials or in oxygen deficient atmospheres)

b. If the source is clearly outside the building:

(1) Initiate sheltering and consult with emergency responders about the likely duration of the event (how long until the release will be contained). Sheltering is appropriate only if the hazard is known to originate outside the building and if there is no indication that the hazardous material has begun to enter the building.

(2) If the contamination entered the building, use protective equipment, if available.

c. If the source cannot be quickly determined:

(1) If there is no odor or other sensory indications, evacuate and initiate purging.

(2) If there is an odor or other signs, use protective masks, then determine if the air is clean air outside the building. If so, evacuate.

(3) Check for other possible indicators of the source:

(a) In multi-story buildings, if signs/symptoms are not apparent on adjacent floors, it is likely an internal release on the affected floor.

(b) Visible signs outside the building, such as observed responses of people outside, indicate an external release.

Attachment 1

REFERENCES

AFH 10-222, Volume 3, *Guide to Civil Engineer Force Protection*
AFH 10-2502, *USAF Weapons of Mass Destruction (WMD) Threat Planning and Response Handbook*
AFI 32-4001, *Disaster Preparedness, Planning and Operations*
AFMAN 10-2602*, Nuclear, Biological, Chemical, and Conventional Defense, Operational Concepts (DRAFT)*
AFPAM 32-1147(I), *Technical Manual, Design and Analysis of Hardened Structures to Conventional Weapons Effects*
AFTTP(I) 3-2.33, *Multiservice Procedures for Nuclear, Biological, and Chemical (NBC) Defense of Theater Fixed Sites, Ports, and Airfields*
Centers For Disease Control and Prevention, Health Advisory, *How to Handle Anthrax and Other Biological Agent Threats, 12 October 2001*
DOD *Antiterrorism Construction Standards (DRAFT), August 2001*
DOD O-2000.12-H, *Protection of DOD Personnel Against Acts of Terrorism and Political Turbulence*
National Institute for Chemical Studies, *Shelter In-Place at Your Office, November 1999*
US Air Force Technical Order 14P4-9-31, *Mask, Protective Field, M17, M17A2, and Accessories*
US Army Corps of Engineers, ETL 1110-3-498, *Design of Collective Protection Shelters to Resist Chemical, Biological, and Radiological (CBR) Agents, February 1999*
US Army Report ECBC TR-034, *Experiments in Sheltering In-Place: How Filtering Affects Protection Against Sarin and Mustard Vapor, June 1999*
US Army Report ECBC-TR-106, *Report of the Joint-Service Collective Protection Assessment Team on US Air Bases in Southwest Asia, August 2000.*
US Army Report ERDEC-TR-366, *Expedient Sheltering In-Place: An Evaluation for the Chemical Stockpile Emergency Preparedness Program, June 1996*
US Army Report ERDEC-TR-520, *Applying Collective Protection to Existing Buildings at Osan and Kunsan AB Korea, September 1998*
US Army Corps of Engineers Pamphlet, *Protecting Buildings and Their Occupants from Airborne Hazards, July 2001 (DRAFT)*
US Environmental Protection Agency Fact Sheet EPA 550-F-01-005, *Local Emergency Planning Committees and Deliberate Releases: Addressing Terrorist Activities in the Local Emergency Plan, August 2001*

Attachment 2

INDIVIDUAL PROTECTIVE ACTIONS FOR A HAZARDOUS MATERIAL RELEASE

The decision to take individual protective actions must be made quickly and implemented immediately when notice of a hazardous material release is received. Actions are provided for three primary scenarios: (1) personnel who are outside of a building, (2) personnel who are inside a building when a hazardous material is released outside the building, and (3) personnel who are inside a building when a hazardous material is released inside the building. The actions below depend upon the situation and may be modified based upon advanced warning of a release or at the direction of emergency response personnel.

NOTE: Individuals who observe an incident or have information concerning the incident should contact Security Forces or other emergency response personnel, as soon as possible after the incident occurs.

A2.1. Actions for Personnel Outside of Buildings.

A2.1.1. If you are outside, take cover as needed to protect yourself from fire, explosive hazards or falling objects.

A2.1.2. Notify other personnel in the vicinity, don available protective equipment, and evacuate the area by moving in an upwind or crosswind direction away from the point release (if visible).

A2.1.3. Report the incident to the Fire Department or Security Forces Desk if emergency response forces are not at the scene.

A2.1.4. Move to the unit assembly point or location provided in the protective actions plan (if not located in the hazard area).

A2.1.5. Perform self-aid and buddy care as needed.

A2.1.6. Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk. If you are already in a vehicle, roll up windows, turn-off the ventilation system, and attempt to safely exist the hazard area.

A2.1.7. If you cannot evacuate, go to the nearest building and take cover inside.

A2.1.8. After evacuation or sheltering, contact your unit control center and advise them of your location and situation.

A2.1.9. Remain in shelter or at the assembly area and continue to wear protective equipment (if available) until directed otherwise by your unit or emergency response personnel.

A2.2. Actions for Personnel Inside of Buildings - External Hazardous Material Release.

A2.2.1. Take cover if needed to protect yourself from fire, explosive hazards or falling objects.

A2.2.2. Don available protective equipment.

A2.2.3. Notify other personnel in the vicinity.

A2.2.4. Report the incident to the Fire Department or Security Forces desk if emergency response forces are not at the scene.

A2.2.5. Turn off the building HVAC system(s) and exhaust fan(s).

A2.2.6. Implement shelter in-place procedures.

A2.2.7. Move to the designated safe room, if available.

A2.2.8. Perform self-aid and buddy care as needed.

A2.2.9. Lock up or secure classified material and funds if possible.

A2.2.10. Evacuate the building if directed by the unit control center or emergency response forces.

A2.2.11. If directed, evacuate by moving in an upwind or crosswind direction away from the point release (if visible). Move to the unit assembly point or location provided in the shelter plan. Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk.

A2.2.12. Contact your unit control center or the Base Command Post and advise them of your location and situation.

A2.2.13. Remain in shelter until directed otherwise by your unit or emergency response personnel.

A2.2.14. Do not allow entry or exit during the plume passage. However, remain alert for personnel seeking entry into the building to seek shelter from the incident. Allow entry if identification is confirmed and the situation does not present a high risk to others within the building.

A2.2.15. When notified that the outside hazard has passed, perform building purge procedures.

A2.3. Actions for Personnel Inside of Buildings - Internal Hazardous Material Release.

A2.3.1. Take cover if needed to protect yourself from fire, explosive hazards or falling objects.

A2.3.2. Don available protective equipment.

A2.3.3. Notify other personnel in the vicinity.

A2.3.4. Report the incident to the Fire Department or Security Forces Desk if emergency response forces are not at the scene.

A2.3.5. Turn off the building HVAC system(s) and exhaust fan(s).

A2.3.6. Perform self-aid and buddy care as needed.

A2.3.7. If possible, close doors and windows within the release area to contain the hazard.

A2.3.8. Lock up or secure classified material and funds if possible.

A2.3.9. Evacuate the building.

A2.3.10. Once outside, evacuate by moving in an upwind or crosswind direction away from the building.

A2.3.11. Move to the unit assembly point or location provided in the protective actions plan (if not located in the hazard area). Do not drive vehicles unless directed by emergency response forces or unless required to evacuate injured people or those that cannot walk.

A2.3.12. After evacuation, contact your unit control center and advise them of your location and situation.

A2.3.13. Remain at the assembly area until directed otherwise by your unit or emergency response personnel.

Attachment 3

SHELTER IN-PLACE
KIT RECOMMENDATIONS

The specific contents of a shelter kit depend upon the location and capabilities of the protected shelter area or safe room, the planned number of occupants, and the likely period of shelter occupancy (day, night, or both). Where possible, use items that are already available within the shelter area or can be quickly moved into the area when the shelter is activated. Add or remove items based upon local guidance, climate, and existing capabilities. Check the shelter kit every 3 or 4 months to verify the dedicated kit items are on-hand and serviceable. Some items, such as duct tape, flashlights and batteries, and first-aid supplies, may disappear if occupants use them for other purposes and fail to replace them after use. Individual protective equipment, such as a protective mask that is provided to an individual, is not normally part of the shelter kit. If pets or other animals will be sheltered, consider the need for additional space and supplies required to care for the animals during the shelter period.

A3.1. Shelter Kit - Office, Auditorium, Medical, School, or Child Care Building.

NOTE: Prepare a shelter kit for each separate safe room or protected area.

A3.1.1. Installation and building shelter plan and this guide

A3.1.2. AFMAN 10-100, Airman's Manual

A3.1.3. Flashlight with one set of spare batteries (one for every ten people)

A3.1.4. Portable radio and batteries

A3.1.5. Fire extinguisher

A3.1.6. Clock (battery or windup)

A3.1.7. First-Aid Kit (sufficient for number of occupants)

A3.1.8. Bottled water (1 quart for each person)

A3.1.9. Blankets (two for every ten people in warm or temperate areas; sufficient for number of occupants in cold weather areas)

A3.1.10. Baby food, formula, and accessories (if infants will be sheltered)

A3.1.11. Snacks, bottled drinks, and snacks

A3.1.12. Children's books or games (based upon ages)

A3.1.13. Religious books or materials of choice

A3.1.14. Telephone or Cellular phone with spare battery

A3.1.15. Duct tape (sufficient rolls to seal air entry routes and/or attached plastics sheeting)

A3.1.16. Scissors or a small utility knife

A3.1.17. Plastics sheeting (sufficient quantity to seal air entry routes such as air conditioning vents, exhaust fans, etc.). Consider pre-cutting to plastics to simplify attachment and reduce shelter activation time

A3.1.18. Towels (sufficient to block bottoms of doors between protected area or safe room and the outside)

A3.1.19. Stretchers or litters (sufficient to enable movement of personnel with mobility limitations if they must be carried to the safe room or shelter area)

A3.1.20. Administrative supplies (pencils/pens, paper, phone book)

A3.2. Shelter Kit - Residential Home, Apartment, or Dormitory Room.

A3.2.1. Building shelter plan and/or this guide

A3.2.2. AFMAN 10-100, Airman's Manual

A3.2.3. Flashlight with one set of spare batteries (one for every four people)

A3.2.4. Portable radio and batteries

A3.2.5. Fire extinguisher

A3.2.6. Clock (battery or windup)

A3.2.7. First-Aid Kit (sufficient for number of occupants)

A3.2.8. Essential medications

A3.2.9. Bottled water (1 quart for each person)

A3.2.10. Baby food, formula, and accessories (if infants will be sheltered)

A3.2.11. Snacks, bottled drinks, and snacks

A3.2.12. Children's books or games (based upon ages)

A3.2.13. Religious books or materials of choice

A3.2.14. Telephone or Cellular phone with spare battery

A3.2.15. Duct tape (sufficient rolls to seal air entry routes and/or attached plastics sheeting)

A3.2.16. Scissors or a small utility knife

A3.2.17. Pet food, water, and essential supplies

A3.2.18. Plastics sheeting (sufficient quantity to seal air entry routes such as air conditioning vents, exhaust fans, etc.). Consider pre-cutting to plastics to simplify attachment.

A3.2.19. Towels (sufficient to block bottoms of doors between protected area or safe room and the outside)

A3.2.20. Administrative supplies (pencils/pens, paper, phone book)

Attachment 4

Building Assessment Checklist For Sheltering In-Place

Building Number: _____Unit: _____ Date: _____

Building Custodian: _____ Phone: _____

Assessment Conducted by: _____ Phone: _____

Total Building Square Footage: _____Current Building Use: _____

Line	Information or Assessment Area	Remarks
1	Type of construction (block, cast-in-place concrete, wood, mixed).	
2	Number of floors/number of floors to protect.	
3	Number of rooms/number of rooms to protect.	
4	Total square footage of the floors or rooms to protect.	
5	Total volume of the building or protected portion.	
6	Estimated number of occupants that can/will be sheltered in the building or its protective envelope.	
7	Number of stairwells inside the protected area.	
8	Are stairwells isolated by fire doors?	
9	Type ceiling(s) in the building (drywall, concrete, suspended ceiling).	
10	Condition of hard ceiling above drop ceiling (lift sections of drop ceiling to assess condition/presence of hard ceiling--holes, open access panels, untaped drywall).	
11	Penetrations/intentional openings (other than doors/windows).	
	a. Number that require permanent sealing or repair.	

Line	Information or Assessment Area	Remarks
	b. Number that require expedient sealing or repair.	
12	Exterior windows (or those on protected envelope boundary).	
	a. Number of each size.	
	b. Most prevalent type (sliders, sealed, double hung).	
	c. Subjective general assessment of window leakage.	
13	Exterior doors (or those on the envelope boundary).	
	a. Number of single doors.	
	b. Number of double doors.	
	c. Number of each likely to require weather striping.	
	d. Number of each likely to need replacement (damaged).	
14	Outside-air vents.	
	a. Number.	
	b. Approximate size.	
	c. Locations.	
15	Air dampers for outside air vents (Indicate general type and condition).	
	a. At exterior wall.	
	b. At air-handler unit.	

Line	Information or Assessment Area	Remarks
16	Exhaust fans.	
	a. Number.	
	b. Locations at which they penetrate the envelope.	
	c. Equipped with closable vents or dampers?	
	d. Are closable vents or dampers operable?	
17	Number of window-type air conditioners.	
18	Number of attic access panels or doors (on the envelope boundary).	
19	Number of fireplaces or stove vents or flues.	
20	Are there any peculiar building characteristics that may cause increased air leakage?	
21	HVAC System.	
	a. Number and location of each air handling unit: inside/outside the protective envelope (i.e. inside the hard ceiling).	
	b. If existing HVAC system ducts are outside the envelope (above a hard ceiling), what is the number of supply diffusers and return registers that would require covers or dampers?	
	c. Do the ducts of any of the air-handling units cross the boundary from the proposed protective envelope to an unprotected area?	
	d. Are closable vents and damper operable?	

Line	Information or Assessment Area	Remarks
	e. Are screens or covers present to prevent access to air intakes?	
	f. Are air intakes located at least 10 feet above ground level?	
	g. Clear water drains to prevent water puddling. Dry HVAC systems mitigate the effectiveness of a biological attack.	
22	Entry/Exit.	
	a. Probable location for single entry/exit point (airlock and CCA).	
	b. Is there space for an airlock inside or outside this entrance?	
	c. Number of other entry points that will require control/locking; will each of these doors require the addition of locking mechanisms?	
23	Other considerations:	
	a. Are there occupants with mobility problems that require special considerations?	
	b. Review proposed actions against force protection/security procedures. Select actions to complement or enhance these measures.	
	c. Review proposed actions and any building modifications to verify they do not conflict with existing evacuation plans or safety practices.	
	d. Number of toilets in the building or the proposed envelope. Consider use of chemical toilets, if needed.	
	e. Drinking water availability (substitute bottled water if not available) for planned occupants.	
	f. Telephone and/or E-Mail access in the protected area. Consider using wireless phones.	
	g. Is there television or radio access in the proposed envelope?	

	Information or Assessment Area	Remarks
	h. Review proposed actions against fire protection and safety requirements. Consider special requirements for child care centers, schools, and medical facilities.	
	i. Are mailrooms and supply receiving areas and HVAC systems isolated from the remainder of the building?	
24	Prepare AF Form 332. Base Civil Engineer Work Request, to request approval for self-help or CE work projects to implement shelter in-place enhancements.	

NOTES